

Hawaii
Australia
New Zealand

H. S. Ladd

50c.

Reuben P. Dodge Museum

HONOLULU, HAWAII

REVENGE BOOK

BERNICE P. BISHOP MUSEUM
HONOLULU, HAWAII

FIELD NOTE BOOK

Subject Geology

Locality Hawaiian Ids., Australia (p. 30),
New Zealand, p.

Member of Staff A. S. Ladd

Date Nov-Dec 1925

30th Jan
Hawaii Bay Collection Dec 6, 1925
On finger of island of shoreward beach
of sand (to all)
(from no. of spot to collection)
3 m. off. to seaward.
(3' grad. - same as.)
1
1

shore gastropods

emphets - large - 2

" small - 13

limpet? - 7

black small 16

" mottled 11

speckled 7

spotted very small 5

dark medium 20

(H. crab) small white 1

?

2

crown speckled 1

" mottled 1

green cord 2

- all alive except 2 large limpets which in
tide were in their shells

Almond - 30± species

Kinimana Bay collecting Dec. 3, 1925

On finger reef - exterior of shore rocks & beach

6 coral - all all sp. (with no special effort to collect coral)

3 coral - all appear to be same sp.

3 gast. - same sp.
one {
one {
one {

Black dog number of old shells mottled
by hermit crabs - black sp. with orange bands
on lip.

also Black on fl. of jar - 3 covered with
also hermit crabs

Note - Camel toe common sp. from rocks
Head region collected Nov. 29 (Spur)
448 Laold

Left with Palmer
all cores collected
at Warkha - Dec 1925

BERNICE P. BISHOP MUSEUM
HONOLULU, HAWAII

FIELD NOTE BOOK

Subject Geology

Locality Hawaiian Ids., Australia (p. 30),
New Zealand, p. 31)

Member of Staff A. S. Ladd

Date Nov-Dec 1925

Itinerary (see also L.G.S. Notebook). ~ Oahu Nov. 25 - Dec. 23 ~ Oahu 1925-

- Nov. 25. Ass. - Misc. - short field trip.
26. Thanksgiving - Sightseeing.
27. - Office
28. Field - around Is.
29. Field - Koko head
30. Office

- Dec. 1 " Hinnuuma Bay - Fish work.
2 Fish Work
3 Fish work
4 Fish work
5 Office $\frac{1}{2}$ day
6 Field - near Alala Pt.
7 Office + fish work
8 Office
9 Office
10 Office + fish work
11 Fish work
12 Field - Dr. Cooke in A.M.
13 Fish work and Field - E. on coral plain
14 Field - Waikiki reef and office
15 Vacation - married
16 " , passport, etc.
17 " , office
18 " , passport, etc.
19 " "

- 20 Field & vacation
21 Office & Fish Work
22 Vacation and preparation to leave.
23 "
24 Preparations to leave - sailed 7th P.M.

Totals:

- 1) Days in field ----- $6\frac{1}{2}$
2) " " office ----- $7\frac{1}{2}$
3) " on fish work ----- 5
4) " sightseeing and vacation -- $1\frac{1}{2}$
and preparations to leave. 30

Days in Honolulu ----- 30

Nov. 25. Short field trip - see I.G.S. notebook 91-92.

Nov. 28. Auto Trip around Island ~ all day trip.

Started out in Palmer's car. Followed road leading up Nuuanu Valley - long grade to Nuuanu Pali. (2 pictures here). The road here passes through a deep notch in the Koolau Range. The power of the wind blowing through the notch is very great. It frequently takes off the tops of towering trees. A steel cable along the cliff enables pedestrians to hold on!

From the road immediately beyond the crest of the divide one obtains a wonderful view of the ocean and the land overlooking between the Koolau Range and the shore, also the cliffs to the NW.

Rivers cut the basalt at a number of places along the road.

The road in this section is nearly paved - an excellent road. Many small docks find land one at the base of the pali. Here a new road (not shown on U.S.G.S. topog.) leads toward Waimanalo.

Much of the low land here is covered with sugar cane. Driving in Waimanalo we took

the old road back to the base of the Pali.

Rabbit Id (Manana Id) was seen. It lies north of Makapuu Head which forms the eastern tip of Oahu. Rabbit Id appears as a semi-circular crater with its highest point to lee of prevailing trade winds. It is an ahi crater & most of the ejecta was carried to the SW by the NE Trades. This is generally true of all the ahi craters on Oahu.

Returning to the base of the Pali the fluted basalt cliffs of the S.E. part of the Koolau Range are well shown. Palmer believes these steep fluted cliffs are due to the constant rainfall in small amounts - possibly enlarging master joints in the basalt. Same thing seen on a small scale on other side of island.

Picture of hatchet-headed ant (Puu Loa or one near it - see Palmer). Through deeply laterized cuts. Soil brilliant red or brown in color due to various oxides of iron.

Palmer does not think much of Davis' recently published opinion that the Koolau range is part of an enormous crater whose other side (if it ever existed) lies beneath the sea. Wonder what sounding show. It is highest to leeward all right.

Along main road following shoreline (see Hawaii Tourist Bureau map) to Kawela Bay on the west side of the northern tip of the island. We got ate lunch and examined lithothamnion reef. There algae appear as rough concentric masses of ls. a foot + across. Coral comparatively rare. Mytiline gastropods abundant but collecting on the whole is very poor. The tide is only about one foot at ss & this is probably the explanation. Bivalves collected from shell heap.

Calc. sand is light brown in color & contains many shell fragments. The eastward beach is well shown - it seems to indicate a lowering

of sea level of about 15' in recent geologic past.

W. & P. believe present ice age area much less

extensive recently.

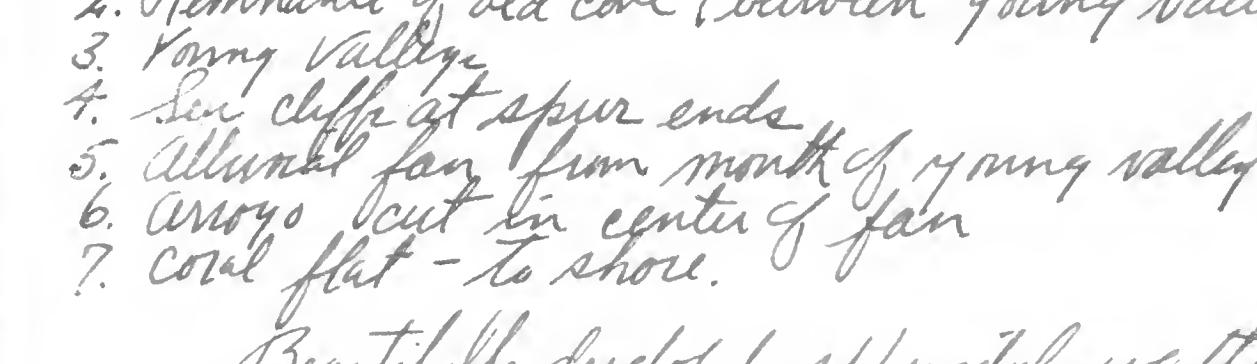
Lithified sand dunes observed at several points along northern coast.

On around to Waialua & visited cane plantation. Saw loading of cane.

Picked up McLean (one of Palmer's students) & cut across island to Pearl Harbor. This drive was across a youthful upland - great fineapple country. Some of the water comes through a tunnel over 1000' long through Koolau Range.

Some interesting geologic & physiographic features may be seen by looking from the Waialua Plantation toward the Waianae Range. At least 7 different kinds of surface

may be seen - as follows:



1. Dissected hills of Waianae Range
2. Remnants of old core (between young valleys)
3. Young Valleys
4. Sea cliff at spur ends
5. Alluvial fan from mouth of young valley
6. Arroyo cut in center of fan
7. Coral flat - to shore.

Beautifully developed spherulitic weathering in basalt seen near Waikakalua Gulch.

Rock deeply weathered - all stages observable. While

only a few spherules remain in red-yellow-brown matrix the rock has the appearance of conglomerate or graywacke.

Canties left by tree trunks seen along road at Red Hill, Halawa! Two pictures here - late in P.M.

Stopped at pumping sta. Saw Pearl Harbor, etc. - on to Honolulu.

Nov. 29. Koko Head Trip with Palmer class.

Drove east from Honolulu along Manana Bay beyond Kuhia Pond. Left car here & ascended ridge turning east at top and following secondary road (see U.S. S. I. map). At a point at the head of Manana Bay (on ridge) we stopped to collect small augite ts. $\frac{1}{2}$ " to 1" in length. The rock here is ash & badly weathered. In the loose stuff in the depression between the overlapping beds the ts are very abundant (see spec.).

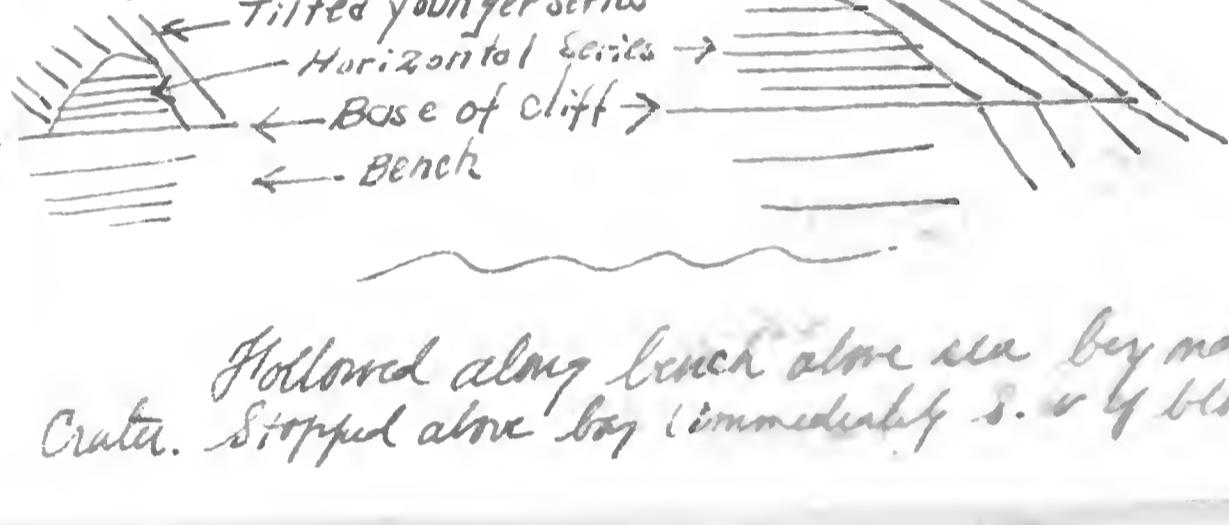
Before descending to the shore at the head of the bay we observed a lava flow - brown

porous, rough material. This is one of the "14 points".

Along a line drawn almost straight from Rabbit Is. on the NE to through Koko Crater to Koko Head on the SW. volcano is known to have broken out in at least 14 places. A number of these were seen & several closely examined during the course of the day. Koko Head, Koko Crater, Rabbit Is and a small unnamed crater (appearing as a hill on the USGS Map) between the last 2 and largest.

Beautiful view of underwater reef in Hanayama Bay seen from above (picture). Decided to name edge - sawn bedded ash & lava flow at head of bay. Occasional large fragments of igneous rock & coral are found in ash. These were evidently blown from the walls of the conduit during the eruption. In many places they struck with such force as to depress the bedding planes notably.

Continuing along the shore a beautiful unconformity is seen between two series of ash beds on the NE side of the bay. A knife edge contact separates the older horizontal bed from the younger tilted bed. If the older ones were tilted it would look "just like the pictures in the text books". The eustatic bench is well developed here and the unconformity can be seen both in the vertical sea cliff and in the horizontal sparsely cut terrace. Small "valleys" cutting the horizontal series are seen filled with rocks of the younger series. Rather narrow "windows" are cut through the younger series exposing the older horizontal beds.



Hollowed along bench above sea bay and Koko Crater. Stopped above bay (immediately S. of blowhole)

to eat lunch. An arid district with fantastic wind erosion. Blow hole caused by undermining of soft bed & breaking through older. Small water force out air & spray - big wave cause spontaneous water. At the sea horizontal erosion has caused up erosion of hole & much effectiveness is lost.

Fauna observed. 1) numerous echinoids of at least 3 types or species (a) flat spined purple, b) round spined purple c) round spined green. These make deep pits in rocks and seem to be an active and important agent in rock destruction. The only molluscs observed were some 9 or 10 sp. of gasteropods (1 large limpet, 2 Cypraea, 2 murex-like sp., etc. see spec.). See ammonites rare. Coral very abundant. The fauna in the strong surf must be rich. A poor coat compared to Fiji; acetate but better than that seen yesterday.

On to small crater previously mentioned. It is very perfect in shape - about 1000' across & some 35' deep (i.e. below lowest point of rim). Composed chiefly of basaltic lava (containing some olivine). - very porous & very rough. At one point pseudo-glacial striae were observed. These were due to hard fragment passing over cooling but still plastic lava. A small amount of ash on the leeward side may represent last spasm of small crater (Palmer) or may have come from Koko crater (CKW).

The journey from shore to small crater was made by ascending first a gently sloping alluvial fan & then the rough air surface of a lava flow.

From the crater a good view of Koko crater could be had - looking into it from the low windward rim also by looking in the opposite direction (NE) another of the "14 points" could be seen - a hummock of lava with a "trace" of a central depression or crater.

5

On both of the above trips much beautiful and unusual vegetation was seen. The light green patches of the *cucurbitaceae* tree stand out among the darker green of the other vegetation giving what McCoy has called "tapestry vegetation" - a clever descriptive term.

Dec. 1.
Felt real reef work. To Koko Head region with Palmer & Stone. They left me at Hanauana Bay about 9:30 - worked there until 2:00 P.M. One can wade out on reef to its outer edge. The bay is only partly filled with coral - in between the more or less continuous patches are deeper sandy pools of various sizes. There seems to be very little ground coral. Had my glass-bottomed box & hence did not collect as much as I might have otherwise. *Cornus*, *Cyperaceae*, etc. not common on reef. Quite a series of shore gastropods (mostly small). No pulmonates. Total of over 20 sp. gastropods and half a dozen corals.

Dec. 6.
With Palmer & Stokes to latter's country place near Alulu Pt. (somewhat less than 1 mile NW of Pt.). Tramped about in morning & collected few things from raised reef (about 5-10' above high tide). Material well fossilized & abundant. A lot of similar stuff from road material nearby. In some cases of original color is retained. Saw much lithified lime sand, weathered basalt, etc.

Palmer believes that the reefs from which the corals that now make up most of Ko'olau Range) once lie some distance north & east of present cliff. This formed an enormous dome (not a crater) part of which founders later leaving present remnant. It then is a fault scarp which has been eroded back some distance.

The depression now occupied by Kaelepula Pond is a drowned valley. The low scarp N.W. of the pond may be (probably is) a sea cut cliff or a river cut cliff. The rock is lithified during land-shore much undercutting forming caves. No elevated reef seen except along shore.

Dec. 12.
Field trip in morning with Dr. Cooke. Drove in his car up Manoa Valley & to point near top of Tantalus - hence its summit & around rim of the old crater. No rock is ~~partially~~ exposed - well overgrown with vegetation - much brush & low underbrush, some trees - among them patches of native forest. This area is now a forest reserve and much planting is being done. Some years ago a shallow lake existed in the crater - now dry.

The purpose of the field trip was to introduce me to the methods of collecting land shells so that I may do this work successfully in Fiji. Shells were found in some abundance under various conditions. In general one should search in protected places - i.e., protected from sun & rain. The tree or arboreal species are found on the underside of the leaves, especially where leaves are thick & closest. The undersides of limbs & the bases of trunks are also good places - loose bark, cracks, & rubbish at foot of trunk. In low brush one must get down & look up - turn back leaves of various plants (especially thick broad ones), some ferns good - also back of petioles of leaves - where leaves join stems. Shells should be turned over. - Tree & other loose stuff near ground give good results.

It takes a practiced eye to pick out these shells & Dr. Cooke did most of the collecting - though improved after the first few minutes.

Land Snails in general are common in the tropics & not restricted to wet places as I had supposed. Many species are very restricted in their distribution. Most "species" have numerous varieties or "geographical races" that are exceedingly restricted - such one being characteristic of one hillside or even one tree (colony). For example a given species may be distributed on one side of a gully & omitted on the

other! Certain shell form (i.e. proportion of length to breadth, etc.) are very characteristic of limited areas. "Color forms" of a given species may be mapped! Then last all evidently rapidly-recurring mutations - offspring of a single individual for these shells are homoplactic - pugnacious most of the time. The many facts known about the distribution of land shells seem to show that they spread with exceeding slowness for it seems that many closely adjacent colonies have remained isolated by simple barriers long enough to develop definite character - in many cases of specific importance.

The distribution of these various "geographic races" on a single island ties up with the distribution of genera on different islands.

Thus in the Hawaiian group where the shells are fairly well known Dr. Cooke believes he can work out the sequence of separation of the different islands rather accurately - assuming that they were once connected - a belief that most scientists (at least most geologists!) do not hold.

Dr. Cooke does not believe in the "drift theory" nor any other of the same class. He believes in land connections & states some remarkable evidence of distribution to back up his beliefs.

It is a pity that no one has succeeded as yet in raising land shells in the laboratory because such studies should throw valuable light on their migratory powers, rate of mutation, etc.

It seems a strange fact that certain species have migrated all over the Pacific within the time of man.

Preparation -

Drown in water 12+ hours - then kill snails in extended condition. Place

in 40% alcohol for at least several hours. Clean - (pull large ones, squirt small ones).

Equipment
1 gross vials - 3 sizes { $\frac{1}{2}$ quart 2 drams.
bal. 144 = $\frac{1}{2}$ (see below)

✓ see Cooke. ✓ alcohol. (Ball's kit)
✓ latex.

Cook advises emersion in 50% alcohol after drowning. When shipping ~~dry~~ ^{FWC} off alcohol & wrap label around bottle-packet well.

Sun Dec. 13.

With Palmer in afternoon to Ewa coral plain. Drove to Bot. Mus. Sta., parked car and walked toward the sea over rough but bare coral plain.

Dead shells of thousands of land snails cover the ground so that a handfull of the loose stuff reminds one of the dry fauna at least as far as number are concerned. A few living specimens are to be found, around the bunches of low tree but the land snails practically disappear when the bulk of the vegetation has cut off. This was done fairly recently to grow sugar (?) up & some plants still remain.

The coral rock itself is gray tough fl. - which on fresh surface is only an ~~abundant~~ except locally. Upon finding good blocks we sat down & cracked rock. Quite a fauna resulted. A *trachia* is most abundant species (see opercula). *Cone*, *cypraea*, *conus*, etc. also found. Crushing & washing rocky would give good results - some rock collected for this purpose.

Dec. 14 - Mon.

To Edmondson's lab. at Waikiki. Collected on fringing reef with Dr. Edmondson & Mr. Petergaard. Used a glass bottomed

5

box for the first time - will never go out without one hereafter. Edmondson also takes a short cruise with him. Saw his corals set in cement blocks, & many others, squat stars, sea cucumbers, corals, corals etc. etc. - but collecting thus far - especially good close to shore and along rocky wall.

Looked over Oetegaard's collection of gasteropods. He is especially interested in genus *Cyprea*. (And no wonder!).

Dec. 20. Trip to eastern side of Oahu with Stokes - around southern edge of Waianae. Good collecting along shore from raised reef - see map. Eustatic bench well developed, in one place shore beautiful desert varnish - following coral sands.

Departed for Fiji Dec. 23rd



5

18

1985
II
Ladd
255

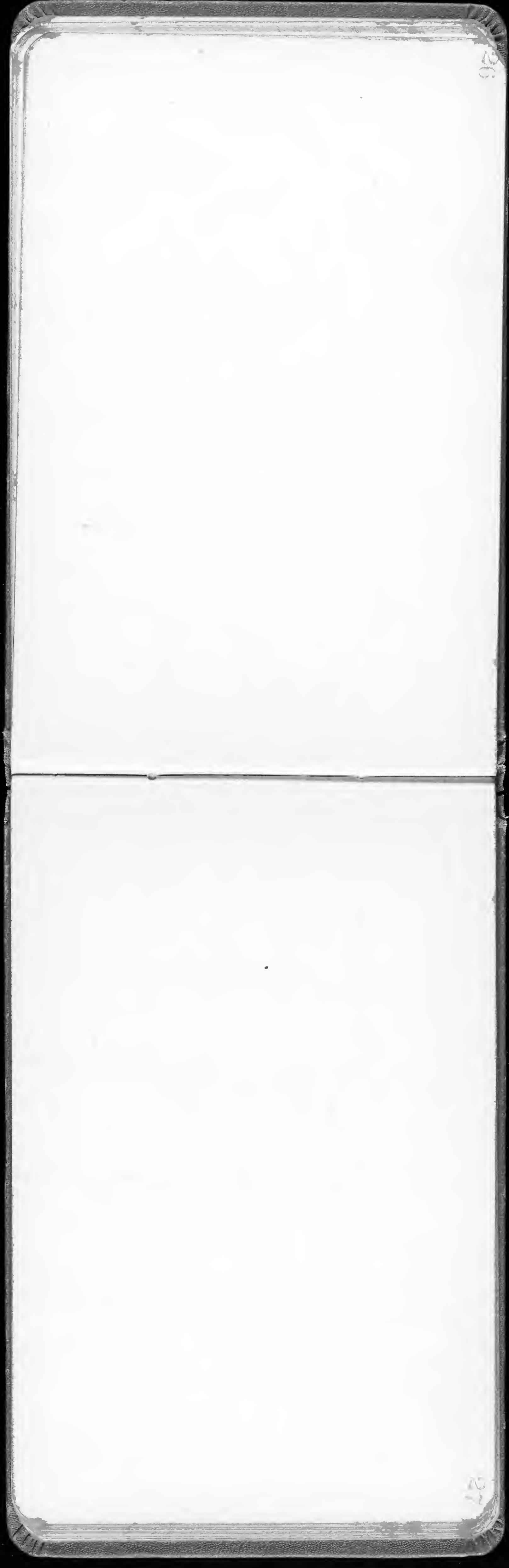
255

Ladd

II

1925

18



Feb
23

Feb 23rd. Tues.
Arrived Sydney - landed at famous
Circular Quay about 1:30 P.M. To Metropole
& Australia but 1st class looked well
Took double room at £16/6
each & no fresh bath! (including
breakfast, however). ~~£16/6~~ + ~~1/-~~

Feb 24 - Wed - Feb 25 (Thur)
Stayed at Empire Hotel - 8/6 each per
day with breakfast. Tram ride around
town, letter to home, etc.

- Mich 3 (W.W.H.)
To home. Total £16 - 1/-

Feb 26 - Thur - Feb 27 (Fri)
Spent day at Bondi Beach - 1/-

Misc. Schol. Note - Sydney, Australia
Feb. - Mar., 1926.

General:

The city of Sydney is located on a tongue of Triassic rock (chilly sandstone). This tongue borders the eastern coast of N.S.W. for some miles north & south of Sydney and is projected to the northeast. Other outcrops occur in eastern N.S.W. The Triassic divisions as given by C. A. Suesmitch (Intro. to the Geol. N.S.W. - Syd. 1914) are as follows:

Triassic +	Talbragar Series
	Artesian "
Tumut +	Clarence "
	{ Upper Clarence - sh. etc. Middl. " ss. Lower : ss, sh, coal & conq.
Tumut + Tumut Series	Hawkesbury "
	{ Hawkesbury " Narrabian "

The rock in & around Sydney is said to belong to the Hawkesbury stage - consists mainly of massive sandstones & grits (100' at Sydney) - occasional thin band of shale - occasional beds of carbonaceous shale often containing plants, fish & fresh water shells. (see p. 159-161.)

Bondi - visited quarry in typical sandstone

and up - much surprised and at

great thickness of beds. Suesmitch

sometimes they reach 60' in thickness!) the main bedding planes

are regular. The stone is easily

worked, light tan in color, & durability

rather uniformly with age. Does not

seem to streak & stain it much.

or our Bedford stone.

La Perouse - Mar. 4th (thus).

Good exposure at cutting at end of tram line. 40± exposed, coarse ss. with 8-10' of carbonaceous shale interbedded at first feet above the base. The next few inches of shale contain thin layer of ls. less than 1" in thickness. - good example of gradation / gradual change of conditions. Sand grains angular (not sharply so, however) - cross bedding very well developed. Column of jointing at top of exposure. Suesmitch explains this as follows: heat & salt dissolved saturated ss. - convection currents heat ss. for some distance & expansion occurs - later contraction & fracturing saw no evidence of dissolution at La Perouse - no fossils seen.

Sandstone beautifully exposed along the coast near La Perouse opposite Burleigh Id. Here dips are high & cross-bedding the rule. Wind & wave have eroded beds into fantastic shapes - broken, pitted, honeycombed, weathered - all true there. Took photo.

Some locality is rich in marine molluscs & other invertebrates (modern). Simple lamellibranchs are very numerous; corals, gasteropods, & 8+5 very sharp, etc. to 100 ft. species of common forms.

Mar. 5th Fug To Gingin immediately to meet members of geological party. Dr. C. G. Smith is head list

23

he was not in. Met Dr. Waterhouse (Economic - 3rd in dep't) Dr. Brown (2nd in charge - Petrology) Dr. W. Woolnough (who is no longer connected with Univ.) & Mr. Osborne (or Osburn - a young chap newly appointed). Had long talk with Woolnough who approved my Fiji plane. Recommended careful working of Singatoka valley. He will deliver paper on Fiji & N. S.W. Ord. before I leave. He has worked a great deal on N. S.W. Ord. Discussed photography in Fiji - put film back in tea container - make double frame for carrying film & camera - never let sun get very hot - use Injul against this Grand. Write to him.

met Dr. David & Prof. Emerton - no interest

now at all.

Woolnough gave me letter to Mr. E.C.

Andrews, Fort. Geological Survey Dept. Sydney.

Mr. Dunn is genl. paleontologist (1st or

routine man) but not an entomologist,

or paleontologist has been here with paleontology

in N. S.W. That of Victoria worked up

better.

I'm to see Waterhouse Wed. - meet

P. L. Cotton & Waterhouse brother (Agric. Dept.)

He has had 2 yrs. in Fiji teaching

Fiji agriculture, etc. - kind of missionary.

L. L. Waterhouse tel. 33916.

Our Pacific fish & Insect wings

from Deny shale at Brookdale - quarry

not very good.

Mr. Dunn wants H. madsen from

Fiji - will send note.

All members very kind in suggesting

tips, etc. Sydney cleaner

but ground are poorly cared

for. Went to see dep't in detail wed.

in Pitt St. for coupled hours. It
is located, a beautiful brown sandstone
building on the east side of Hyde
Park in College St. Their collection
in the whole are complete well
arranged & well labeled. The arrangement
might be improved in some ways
& in the geological section the lighting
is, very poor. Especially attractive
are their mounted collections (birds etc.)
Australian animals & birds, &
their instructive sheet exhibits. Then
they have a nice one of miscellaneous
labeled "Attack & Defense" - here
are armored fish, porcupines, etc. Collection
of "Australasian" Marine mammals
is very large & well labeled. Among
the Australian animals the giant
sangurus (a restoration) over 15 feet,
the wombat, fruit bat, kangaroo,
wallaby, etc. are exhibited. The

Museum issued a good little

Magazine - see copy pasted below

The museum building was
well patronized the day of my visit.
It was Sunday - Museum open
8-5.

Among the mineral specimens were
a series of casts of famous Australian
nuggets - including the "Welcome Stranger"
weighing over 1,000 lbs.

Mon. Mar. 8.

Typed & sent letter to Gurney

Called upon Mr E G Abbott,
Government Geologist & received a note
of introduction from Dr W C White
talked with him for an hour. Mentioned
his early work on Fiji - he regards
them as private attempts - has no
report. Gave me a copy of his
Pres. Address to Royal Society N.Y.C.
1883 - A contribution to

26.

Hypothesis of Coral Reef Formation. Discussed the origin of reef, the idea is erosion platform stable through the Pleistocene in many areas. Believe there are no Pleistocene reefs at Viti Levu (accept and of Paleozoic not sure of absence of fossil remains). However it is added as of Langroup - the Pleistocene which fossiliferous coral rocks called rock is Tertiary would like to return to Fiji but is too busy with routine work to do so. If Palmer & I go to Vanuatu he recommends Turatua, Thethia (Cicci), Olaquala, Vanua Malava, Vigeo, Kula. While in Fiji he did little in Viti Levu. He impresses me as a fairly capable man but I suspect

that he is not really enthusiastic
about research. Thinks a deal
about his position & the fact that
he has not had a B.S. degree.
Cautiously asked what of American
geologists (Shroyer, Fernández) duly
syndicated to him. Prudite a bit
about his climbing achievement.
Refused to know quite a bit about
America. As I left, he asked
me "How long I will have my
degree, etc." I confessed to being
yet a youngster. Said he did not
have degree - I sympathetically
remarked that he "will need
one now" - he fairly purred!
Dave came for lunch, 70
Morphological Museum on
the St. in S.M. Beautiful collection
of Indian arrowheads made
from geological drift rocks.

20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
8010
8011
8012
8013
8014
8015
8016
8017
8018
8019
8020
8021
8022
8023
8024
8025
8026
8027
8028
8029
8030
8031
8032
8033
8034
8035
8036
8037
8038
8039
8040
8041
8042
8043
8044
8045
8046
8047
8048
8049
8050
8051
8052
8053
8054
8055
8056
8057
8058
8059
8060
8061
8062
8063
8064
8065
8066
8067
8068
8069
8070
8071
8072
8073
8074
8075
8076
8077
8078
8079
8080
8081
8082
8083
8084
8085
8086
8087
8088
8089
8090
8091
8092
8093
8094
8095
8096
8097
8098
8099
80100
80101
80102
80103
80104
80105
80106
80107
80108
80109
80110
80111
80112
80113
80114
80115
80116
80117
80118
80119
80120
80121
80122
80123
80124
80125
80126
80127
80128
80129
80130
80131
80132
80133
80134
80135
80136
80137
80138
80139
80140
80141
80142
80143
80144
80145
80146
80147
80148
80149
80150
80151
80152
80153
80154
80155
80156
80157
80158
80159
80160
80161
80162
80163
80164
80165
80166
80167
80168
80169
80170
80171
80172
80173
80174
80175
80176
80177
80178
80179
80180
80181
80182
80183
80184
80185
80186
80187
80188
80189
80190
80191
80192
80193
80194
80195
80196
80197
80198
80199
80200
80201
80202
80203
80204
80205
80206
80207
80208
80209
80210
80211
80212
80213
80214
80215
80216
80217
80218
80219
80220
80221
80222
80223
80224
80225
80226
80227
80228
80229
80230
80231
80232
80233
80234
80235
80236
80237
80238
80239
80240
80241
80242
80243
80244
80245
80246
80247
80248
80249
80250
80251
80252
80253
80254
80255
80256
80257
80258
80259
80260
80261
80262
80263
80264
80265
80266
80267
80268
80269
80270
80271
80272
80273
80274
80275
80276
80277
80278
80279
80280
80281
80282
80283
80284
80285
80286
80287
80288
80289
80290
80291
80292
80293
80294
80295
80296
80297
80298
80299
80300
80301
80302
80303
80304
80305
80306
80307
80308
80309
80310
80311
80312
80313
80314
80315
80316
80317
80318
80319
80320
80321
80322
80323
80324
80325
80326
80327
80328
80329
80330
80331
80332
80333
80334
80335
80336
80337
80338
80339
80340
80341
80342
80343
80344
80345
80346
80347
80348
80349
80350
80351
80352
80353
80354
80355
80356
80357
80358
80359
80360
80361
80362
80363
80364
80365
80366
80367
80368
80369
80370
80371
80372
80373
80374
80375
80376
80377
80378
80379
80380
80381
80382
80383
80384
80385
80386
80387
80388
80389
80390
80391
80392
80393
80394
80395
80396
80397
80398
80399
80400
80401
80402
80403
80404
80405
80406
80407
80408
80409
80410
80411
80412
80413
80414
80415
80416
80417
80418
80419
80420
80421
80422
80423
80424
80425
80426
80427
80428
80429
80430
80431
80432
80433
80434
80435
80436
80437
80438
80439
80440
80441
80442
80443
80444
80445
80446
80447
80448
80449
80450
80451
80452
80453
80454
80455
80456
80457
80458
80459
80460
80461
80462
80463
80464
80465
80466
80467
80468
80469
80470
80471
80472
80473
80474
80475
80476
80477
80478
80479
80480
80481
80482
80483
80484
80485
80486
80487
80488
80489
80490
80491
80492
80493
80494
80495
80496
80497
80498
80499
80500
80501
80502
80503
80504
80505
80506
80507
80508
80509
80510
80511
80512
80513
80514
80515
80516
80517
80518
80519
80520
80521
80522
80523
80524
80525
80526
80527
80528
80529
80530
80531
80532
80533
80534
80535
80536
80537
80538
80539
80540
80541
80542
80543
80544
80545
80546
80547
80548
80549
80550
80551
80552
80553
80554
80555
80556
80557
80558
80559
80560
80561
80562
80563
80564
80565
8

Mr. Webb 10.

After being able to get a lift
we got down to the Hume
River. Came up. The
water seems to be over 100
feet west of Sydney. Our
route will be about four hours
by a little road west. Our
destination today is the
labeled town of Katoomba which
we reached shortly after noon.
The drive thus far has
been an excellent one from
a scenic point of view. What

of the little all day and
gentle. Instant rain obseru-
ly smoke from countless
smok fires of all sizes. Poor
fair - day clear & rather warm
Stepped for "morning tea"
on route at 11² a.m.

On a beautiful blue white
holding 20 passengers in comfort.
Two salmons, gossamer, found

"female man with a poodle
dog on one night (poor humpbacked
thing!)

only day. Started home & out to see scenery in P.M.

Some of these valleys are fully
1000 feet deep - hundreds of
feet of sheer rock exposed
as the water takes
slopes. Pinnacles isolated
chimneys add to the beauty
of some of the cliffs.

Stay well this morn. The "Blue Mountain" - Blue Valley would be a more appropriate name. The blueness at the present time is due chiefly to smoke from bush fires.

Rock near L. Leombas is chiefly coarse ss. with ferruginous stains. It is what a ~~thin~~ - some red & iron. There are some beds of conglomerate containing pebbles of clear, milky, & smoky quartz. Locally cong. also is cemented by iron oxide. Its concretions probably Triassic. Older rocks may be exposed in Deep Valley bottom.

Pastel much Triassic shale

current from Sydney to Katumba,

Littoral C.R. noteable

This Mar 1.

With Mike over most of the ground I tramped alone yesterday.

Back to top & checked out.

On bus at 100 ft. Sutler Ck. running down at Black Heath. Much of the same type of scenery as will seen about Katumba 1200' valley with scarp cliffs low & steep wooded talus slopes below. Woods fairly open due probably to bush fire at fairly regular intervals. Several species of gum tree make up most of the forest - they are medium to large & with trunk bark black & flaky.

Highest point on road to Blue Mt. is 4,200' above sea level.

Alt. taken by me is said to be 4,800'. The

white line by me is said to

be 4,000' & was made shortly

After I left at 9 A.M. I mounted
my "Puff" & went back up
the road to town and from
thence up generally - poorly
described course till we
climbed over "Lone Rock".

Fairly by steep winding road we
dropped 1500 ft. in 3 miles & arrived
at "Lone Rock" after which road
will still be composed of such

place - embankment high bank &
steep - through rough brush &
scrub - though and in about

Lette to Ray Marshall.

Thur. March 12.

Early morning walk to "Castille"
and found old fossil stone, etc.
Picture & walk after breakfast
to "Banks' Coach House", etc.

Thought "Owend" was in
the P.M. but took a little over
2 hours. The car entirely broken.

By power of description! It is
a newly discovered carbon-fuel
& amorphous. The lighting effect
add greatly to the value. Painted
green walls & straw enable one
to traverse it in good clother,
indeed efficient, not bad mouthed
& quite intelligent.

Carriage of Owen's gas was not
large but one tortuous with many
steps was built. On the whole the
carbon floor seem to bear well
relative to the carbon, flumes of
the highly tilted ls. If ever
is, interesting stuff for the
abundance, delicacy, & color of
its deposited feature. In
many "rooms", say left over
with a central Skating rink,
stalactite, shafts & pillars are just
as usual only. In addition to

5

the "beautiful puzzle" of
greyish stone with etchings
of men. It's superficially
smooth but are very thin
& broken into folds.
Another unusual feature
is the so-called "mystery
figure" - circular ^{shaped} - stone
containing all angles from straight
to the perfect obtuse & curve
in a horizontal plane - even
forming a figure 8! They
maintain the same diameter
or it's a little - they are
circular in cross section. Your
guide tells you that they have
stamped everybody & uses
a mixture of dry sand - hydrostatic
pressure, crystallograph, etc. & everyone
goes "oo-o!"

At first I considered them
min filling left & solution of
surrounding rock. (my suggestion
just occurs to me wif ls. of main
arch). - then resolved to seek
crystallization - which undoubtedly
will explain them satisfactorily.

~~differs~~ (see ahead - infra
March 11).

In evening, dined (^{dinner} &
with Mr. Watson (who will be
wife ate at our table) & Mr.
E. L. Savage of Adelaide. The
last named & I being late &
Watson & wife.

Sat. March 13.

Up just in time for
breakfast. Through "Lucas" was
large - much one rock
& fallen blocks - when climbing, etc.

Isn't this cast your eye to
the - this is what we
call - "get my goat".

Beautiful broken exposed in
one out at one point.

Through "Left Imperial"
Cath. I'm very
careful looking the freshures
of Court. - quite notably
& silvery calcification in form
of white, gray, brown, & red fillets
light, certainly not in showing
up the rock! - saw a state
of water-free natural which
I can feel a bit but there
seems to be very little of the
water again. The older walls
Giant-like Kabylia in out &
one or two points. Some of
it has fallen here
seen in air & become soft

- some in flaky (gauze like
latter is strontium carbonate).

Budge before after suggest
a fracture.

Sun. Mch. 14

Early morning climb to the
top for viewing. 2 of willow trees
are quite tame everywhere about
Cedars House - very flat like
chipmunks of large rock.

Also took picture of flattening
in ls. - they are very well developed
on hill top. Change up to mid t.
in with a sharp hollow dry
Intervening ledge very sharp they
are undoubtably due to solution
by almost pure rain water they
were often on flat or rather
ridge but on exposed faces
at 45° &c. - cf. fluted cliff to
Cahns.

Talk will amount food just,
Mr. Whymark. If I had
misunderstood myself before - &
my whole letter with you on
theology of geology, I feel more
well trained on the subject.

So you will have a idea of
and see (?) in time, how what
has been metamorphosed to

a meta-schist (?) near the

cathet. Intrusion seems it

will fall.

Other fossils - Slimy lips,
Parasites, Habritae, crinoids
remains, etc.

His theories regarding the
origin of the "mystery figures" are
interesting. He thinks they are

the peculiar crystallization

- he found it a peculiarity

+ fairly modification - as follows.

V - stopped
up by
deposition
Brooks
thru here!

A thin normal stalactite
form - bottom sealed by
deposition - side built
out to form broad based
pendant - side opening
closed (against pressure)
+ water bursts through
wall of stalactite to give figure
a right P - later curved due
to peculiar deposition (which
alone could explain the whole
thing). He could not see
my argument that the water,
(in the fissure zone) would first
break through base of stalactite
so recently sealed!

By car took to Sydney
& into Kiama first again. Had
Valley scene, & Echo Pt., etc.
near Katoomba.

Mon. March 15.

23

To Searle about 60' of the
st. below in Pitt. Mr & Mrs George
of Mr & Mrs Watson were in town
for cards.

Tues. March 16.

To Selma early and Dan
Brown who drove me with to
Iron Tide Company's plant at Enfield.
The works are located on the
west bank of the Coopers River
~~the~~ west of main part of town.
Spent the entire morning with
the manager Mr. J. Knowles
had lunch with him. Also met
one of company owners, Mr. K. etc.
Mr. K. is much interested in
his work, knows some geology,
I seen very capable. Plant is

not farmed out, seems to be
operated well.

The pit exposes about 20'

of rock. It is roughly in
outline & quite large. (Plant has

been in operation about 9 years).

In main, (or 1st) the pit
is composed of chocolate, gritty, well
bedded shale which contains

abundant plant remains in the
form of carbon impregnation (at least
one fish has been found here). Locally
this shale is called brown lignite.

Underlying this is a 4'
foot of limestone material &
below this is ss. The latter is

exposed for 2' & Mr. K. says
he has drilled it several feet

more. The ss. is soft & friable
consisting of white, yellow & tan
with occasional flakes of muscovite.

Greenish brown angular shaly
lithic material.

Sediment of clay	
(5)	Silicified
E	④ Mottled clay
	③ shale granitic material
	① Sandstone

Such affection of pit wall - Vert. scale 157 = 2'

A few shale in main body of
Mottled clay which is greenish,
fusiform & contain few muscovite
flakes. Mottled color (black, grey and
brown) due to iron, which however
is not present in sufficient
quantity to color the entire form.
Top 10-15' of the are
exposed. At the top is a hard
silicious layer, thin at the

w. end where, as above, the
layer is quite resistant.

Below it is followed by heavy
iron boulders of iron oxide.

No fossils were seen except
in the silicate shale. Locally the
main body of clay is well bedded
& contains considerable mica.

The outstanding characteristic
of the entire deposit is its variability
(when compared to Paleozoic sea
rocks).

The mica is very difficult
to make 10% of the superficial
clay will be mica, stiff (but quite
at color). This does not give it
strength for the entire term. It has
been described before but can't be
sure if it is right in color & if he
means them because the upper
ones are too dark - hence the
color ones have to be buried

In second stage - placing them
on top of the second column. If he
mixes too much of the coarse
clay with the Duxbury - if he
mixes too much of the hard silicate
stuff they do not shrink properly
& are too porous. What he needs
is a coloring clay & a low
tensile fiber in each column.
etc etc etc.

Plant.

Clay blasted, hand loaded into
barrow & wheeled to car - hauled
out of pit on cart & dumped into
a hopper - crushed in revolving circular
bin under the large white rifle
through floor of bin & is automatically
hauled aloft & mixed (coarse stuff
returning to crusher). Fed into
cylindrical mixer & squeezed out
in parallel slabs - these are cut

to proper length & removed
by hand. One block at a time
is fed to revolving press (each
press contains several dies) & stamped
out tile is removed by hand on a
wooden rock. These are stacked &
dried by hot air from below. Then
scrubbed with tempe & brush.
Fully colored tiles are glazed.

Net waste is about 14%
when it should be about 9%.
This due chiefly to difficulties with
clay and don't get kilns. Demand
for tile is low but exchequer supply
& competition is not keen hence
the company can still operate at
a profit but not indefinitely.

Very little pottery to be
done in this plant but the
Sargan in the village of Omile
Punjab - "American Wafers"

Wed. March 17

3

To Sigtuna church with Mr. & Mrs. Peter J. Tamm who showed us about & took us to lunch. Building all beautiful with high arched windows, tall and glass windows & arched seas. Climbed to top of main tower visited beautiful library & went Hill Cotton, Ulrikshus, Oslo, Miss Brown & West. Also I managed to meet Mr. Dunn share talk. To Murray Museum by plane of afternoon with Correlot (a good mineralogist) Mr. Card. Planned 3d material.

Mr. & Mrs. Watson here for supper - to see "White Cargo" film. Mr. Leon Gordon ^{the} author, here the leading part - a splendid

play though the theme was rather sordid.

Thur. March 18

To St. Olaf's Church with

Mr. G. Osborne. See monograph of Sutton Hoo lead say - nice place for photographic studies

in marine erosion.

To Sigtuna Hill for dinner

to eat with Mr. & Mrs. Watson

Fri. March 19

At 7 time a break in A.M.

It was a vacation. Watson called in morning & took us to

Sigtuna - very noisy having

all the horses in the yard

Sat. March 20

Wet about 10:30 am from today

Left at 7.8. I'll have "y" of
Litho (for). Wt. & S. Sa: you.
& Osborne at 8.15 to see us off
with about \$1000 & best
wishes. Money in small change
but he gave me station. We
are comfortably situated in a
2 bath bibby cabin.

Mon. March 21 - Worked + painted up

the cabin. Not w/ M. Walker yet - will do
soon. Breakfast at 8.15 + had extra

Sun. March 21

Cabin - up early - worked till
10.30 on pictures etc - all up to date
now. Tipped these.

Packed up 3 shades +
left a couple of lib in platinum +
a few more in color.

Mon. March 22.

Tipped up house. Walked
+ strolled with 3 shades.

Began

Working on pictures, took litho back to
C. & C. I. to continue

etc + with a not believe-
able big smile, however, the
whole thing all quite a bit.

Tue. March 23.

Spent most all morning
- the sun was out of course
and a blustery wind - got
Rangette almost home. All day

passed + went up to engage a
room while Frank was coming

from Compt. of Metropolis
- 12.30 a. m. - enclosure (cont'd)

Frank + I are looking forward
to a lot of fun + mail hunting
and writing to others

Mr. -
I am now off
on my vacation
and will be away
until the 1st of October.
I have engaged
a room at the Hotel
Royal for \$35 per week.
I will be in Boston
on the 1st of October
and will be back
on the 1st of November.

Sat. Mch. 26th

Rainy & dull all day. Home

with tipping, etc. No calls
from Mr. Bush worth home.

To buy what I need
from "France" Whitney South
Sea Expedition. Mr. Bush sent a
card (I met Mr. Bailey (?) a
Philippine editor. Later met Mr. Bush
that night. Mr. Bush later home
to get coffee. Tipping, etc. in all.

Sat. Mch. 27

To call on Mr. Brewster,
He has been off drift of Xerophytes
at present so I will take
letter of introduction from Dr. J.
C. Green. Will try to get
time to take close up him
& will have me out to him.

To visit Mr. Brewster on
J.M. Whitney is now gone
to the Amazon with his
wife & son George. He
will be at time of my visit
William Brewster who is
now over 80 years old
and still strong & all well
but infirm, etc. He is
writing a book on a new
field & will have given some
extra polished. And I am
not able yet to go with him.

2

On the way back I found
the water very shallow
and rocky bottom - some
shells and corals and little
gravel - but no & no shells
gravel, rock - sandy bottom
with a red soil - made of
minerals & it is very hard
gravel - If you want to
dig shells.

To the Bright Valley
The top of the slope is not
without interesting features.
There.

Sun Mich 29
To the Bright Valley
Possibly, or at least partly, from
not yet done so far in Quaternary
but it is built over with

very little help broken from
the top of small sandstone crevices
It may be white & form the
first couple of hours in collecting
more middle along the shore.
Large blocks of sea-cake
limestone of the shore. Between
are filled with shelly mud. Corals
extinct. Large number of red
fusulines *Thalictrobia* sp. D. in
abundance in middle of large
blocks. Seen to be 2 species of coral
the largest probably common
steamy water ^{corals} there may be mostly
white lime of growth. Similar
but smaller than one described
by Hutton on Tawes in H. Geol.
No evidence of a limestone bed between
or a great deal more. Many of the
Tawes, Tropics do not form a bed
of any value, always one more

the next day I went
out with my gun
and found a large
area of the hillside
- or in the first gully -
had made a great wind
hole & was by falling further
down the slope in falling
into it. It took me about
one & a few days to get
out of it (near base) (about 100 ft.)
The surface - you will be surprised
at how much they have
done in accumulating themselves.

To support - god will allow
us now up to the slope
of the surface will find
a very steep where a flat
surface buckled - sparse vegetation
on it. Precisely all the
land must step back so as
not to fall back again,

and at the time, the apparent
slope of the rock. (Battering
now). I decided write crater
after taking bottom. If we
can't see on the floor, mud
red & black lava (the type)
filled with bomb like specimen
little vegetation but much shrubby
low scrubby
peaone? ^{monocot}
d. ^{recent?}

So try to see face "will"
but as you can't fight it well
we can only withdraw. Then we
take opportunity old tree floor
and hardens & legend covered
soil on my right. Saw
one fl. when the water
was flooded over it fell - from
the trees down

Augt 20th 1878. 3

Collected about in valley, no soon
left water & flat floor land from

Mr. Webb's

To bridge over stream
about 100 ft. above the
valley floor from stone
and drift through the
latter which cannot be seen
Mr. Johnson at the University
of Denver says to Dr.
Bellefonte where we were
captured through glass case.
He cut one in a hole in the
bank; the case was tube
like, with rough outside.

Presently tiny larva-penultimate
Rippled structure, while, etc developed
In place flea in cavity
when a second flew back
through & settled in place.
There was probably extent for
nearly $3\frac{1}{2}$ of a mil. the same
came originally from the cave
now known as "the tree hill".

Home in evening.

Tue. Aug. 30.

To museum for collection
. A. M. - went down
afternoon trying to get ad.
blackings, etc.

To Bartons for supper
in evening off in later, but
of geology also attended. Met
Mr. F. who was very pleasant.
Like Barton a bit better though
he still appears at old andish

May 8. Went right
through to 3rd

flat. Well I went
through with a certain
amount of difficulty & cost, all
day. Not until the night
before finally in shape.
Now back of Harrow form.
Thought it was not worth
the trouble & B. are not too
directly to vulcanize.

To museum at 9 A.M. &
home to work till 9 P.M.

Thurs. April 1st.

To museum where Mr.
Siffer introduced me to
new curator Mr. Archie, a

very pleasant young man who
gladly agreed to give me space

in which to prepare my
specimens. I will give
note to Mr. Glenden of the
fish exhibit. It looks all well
but has many stuff & no
transition in the Menagerie
least time for Ichthya. Explanation
will follow. Quite satisfied
here - all the time close for several
days!

Met Mr. H. H. Stell at
his home. He shall be a
commercial artist by profession &
is at present the architect
of the new beautiful & complete
collection of modern mollusca
of all sorts. Also some fossil
fossils. Presented me with
tricks & paper & promised
to bring some of modern genera
will be glad to identify &
check up on all of my

from modern stuff I shall
give him duplicates. He
is evidently a very careful
& conscientious worker & I am
much impressed. His
drawings of specimens are
excellent. He has done a
lot of landscape painting.
Wrote Paleozoic fossils.
Horn in every vegetable

Sat. April 2.

Wrote at home till noon.
To Maiford opposite Rangitoto
on account of Mr. Colbeck
all afternoon. See several
triggle, kaw, Endoceras, no
Brachiopods found in shales or
they were found water worn &
similar condition - only at Rangitoto
few shales, no Ophioceras, & shales
at Maiford at base - none

Sat. Apr. 3rd

To Geo in a M. - met
Curator, Mr. Griffo, who showed
me through the geo here in
less than 3 years old but still
remarkably good & will find
you room for future development
He reported recently turned
from a top to Alice, bringing
him a fine collection of animals.
Such will cost out 7 pence for
top (V. little) & 3d bottom
P. C. & 1d each. So
lucky can be requires an
average of 10/-

Wrote & then went
after supper.

Sun. Apr. 4.

Wrote & went to town &

Met Mr. and Mrs. H. in a

Saturday 1st - At about 6
a.m. I awoke & saw clouds
over the mountains to the
west which were 1,000 ft.
and a very dark cloud
over 10,000 ft. I started
of soon & got up to the
Picchu.

How do you get up
in these hills?

Wednesday 2nd

To Huancayo & got much
but no book or library.
The continue long talk with
the Book of Picchu in Q.M.
My first impression of the much
discreased gentleman are very favorable.
After all (dry & weary on the road,
packing, etc) I got to bed.

Tues. Sept 6th

Packed specimens, etc.

If you ever go to Huancayo
to a wonderful trip and nothing
than till after dark. Blue mists
5,700 but view on him as a late
Tumidilly, dusty & filled with
spreading debris, etc. Many signs of
tea & whitemole. Below spring
red engine also damaged us.

A wonderful time in good
company - good for dry
milkmen, trout, fish in the
Holes - a few yellow & blue leaves
of which cannot help but add
to the latest American craze &
a many go - and you under the
name of "counted out".

Wednesday 7th

Up at 6 a.m. for 45 min
and I kept on my way to
have dry & wet yesterdays
go into account. The day
we will be short of sleep

Re - 200 ft.
25
Poke - water enters
Mud volcano - bubbles
up from bottom of crater
The mud bubbles out
50 ft.

From the mud
water bubbles out to Whaka
Crater Whakarewarewa - the
Whaka sprang (the off.)
out & over took the city
of Rotorua filled with
thick smoke & mud etc.
There are numerous holes
springs of all kinds, some
clay, others gypsum with well
built terraced cone of sulphur
inter. these latter were bubbling
& steaming & Hesler's ditch

is full of mud & water
and mud played during
our visit. There are bubbles
of steam water - now they are
full pipe shaped & red. And
they break or burst like a
whip of glass - some usually
without noise, the others
a concussive that bores.
They are mud pots filled
with hot water steam mud which
comes suddenly to the surface. The
bubble starts & will continue
to bubble in thick mud until
from the hot water bubble goes
back with a "plop" a series of
concrete rings are formed around
one the "new form". The mud
is very beautiful, light & porous
smells

Early edition Whaka paper 3

After a good night's sleep we
left early & reached Mo'orea in
time to catch our steamer
which is now due to sail.

An old Maori village below
the main town we have been
turned into a basket. Here we
see a number of natives, women,
& their black work.

At lunch time we worked

about town, visited the stores,

had some souvenirs, little houses,

etc.

In evening we attended a
Maori entertainment & were much
amused by the Haka & many
other dances & songs (see program).

With very little to follow I went
late to bed.

Thurs April 8th.

Rained at 9:30 & 11:00

Up - home again - sawing the
timber of Rotoma at the southeastern
tip of L. Rotoma (N.E. of Lake) -
the harbor leading to Lake Rotoma
Whales & the East End Harbor
around the eastern tip of the lake
& met and saw the eastern shore.
had a view of Motuia Id. in
East Rotoma - and Taki Id.
This is not a haka. Raining
without rain the well out of
the lake we stopped Takitine (not
surprised). Then a very interesting
view north with Whales. Some
water on the south of the place
there. Large whale took up
the water, & the ground
was covered with - a Maori
small wooden & fine & stiff
into one of the trees. Raining
brought up only her tail which

Left at 7:30, hit waterfall,
etc.

Went from Tane to shore
of L Rotokakahi & Rotoiti
and I saw it, but
had to get to another
island to get through
the pass. Went through
giant tree ferns, etc. To Lake
Rotokakahi & back again -
about 1 min. Steeped flat
beds down on a lot of old
dead trees. To Lake Rotomata,
a little like the one here
but clearer.

Rained through Horner's rock
we take a walk trying to see
L Katuna, a beautiful body
of water with low banks of

L Rotokakahi & hill of L Tawau.
To L Katuna we went
through miles of magnificent
lush bush and waterfalls.

Back to man road &
walked to Tikitiki village and
across lake Rotokakahi,

back again to man road
to L Tawau after 10 miles
& walk 3 hours. We also
offered to the Govt
for 1000,000 dollars
each of which I am going to
put up against Blue Tikitiki
gold & silver went Rotokakahi

10

14th The road to Colima
was good & we got off
too early & had to stop.
The local people gave us a
few oranges & have it, and asked
us to stop. They were sent
by inundation & while (Julia?)
M. had to go to the lake
Tzununa (SW corner) - here
a short distance away from the
shore was the now site could be
seen a thin stratum of carbonized
vegetation separating the Tarasca
deposits from the residue of previous
cultures. I only found a few of the
former here. Probably we have
overlain the Tarasca lake
Banked channel & closed lake
going due east & turning south then
NW with passage of some width.

May. Side of hill buried
village here. Good view of
Tawas to the left side

A visit with George to
west shore of L Potomahana
which is crossed by launch going
north & south wdt. Shaded in

of Tarawera, crater, small crater
along side of lake, had small lipographs,
steaming off, etc. The cliff
will be rising.

the world's largest geyser, Waimangu.
Walk up it 2-2½ miles - many
boiling springs, steam, etc. At
the site of Waimangu, a very
hot blue lake in a deep pit from
which water flows toward what
were formerly "Frying Pan Lake"?

Letter to you - writing like with
the pen & it looks like this.

To get around too far
- was yourself & no more.

Left Rotorua by auto - all
the best country. Tauranga material
is available now - good - it is
very well - just last year
had about 1000 ft. of Tauranga
eruption. Also by 330 ft.

To Ohinemutu and Rotorua
- those villages when photographed
are not attractive, looking like straw
huts, etc. and will beautiful

Village of is good - stone

set between 2 groves!

To sand flats hot springs
& mud volcanoes nearly

To "Kutubu" in car.

Sat April 10

By train to Auckland.

Leave Rotorua at 4:30, went to

Mt Ngong up to Waterfall

paper 16 ft. above base of cliff

sun 17 ft. 6.

Wrote at home all day.

Mon April 11.

Tram to Takapuna Beach
etc for boat of day packing
specimens, water, etc. 10:00 am
left Rotorua with Miss Schubert

Mr. Bellamy in car & packing

later.

Tues April 12.

Dark morning about 4:00 am
to sailing. Saw Harbour for
a few moments & took pictures
about town. Sailed about 5:00 am
from Tudor Wharf in Gisborne
Boat with Mr. Bellamy
& Miss Schubert.

Abu Dhabi!

to Leckler & Harrell during day. Also
read Ch. Moody, Illinois' Budget &
enjoyed it very much. Wife didn't meet
you but was up for coffee
yesterday.

Compte pour Handel et mes états
avec les 7 Armoirs
Etat 1st - Sage de Berlin
Sage - la Côte D'Amour - Brest

John J. & S. B. Smith Company
600 Franklin Street San Fran.

Jan 26 1916

W. H. C. used letter to
B. W. C. on 11/12/18

Dell, etc. before October 1st. Am going
to get them in by the 1st of Nov. to you.

a letter of mine (in form) to Mr. J. V. Wilson who is from Duluth.

- going to Toronto to work the railroads

indoor for a while and to Buxton.

3
3

Mon. Sept. 6th - ~~Cloudy~~ Cloudy
wind from S.E. - rain
most of day. Very
wet. Hopped my boat
around with Robie
and John - the water &
Hill Bay were very
calm and smooth.
Set out 45' net
in the middle of the
bay and after a short
time a small trout
was hooked.
Then I went ashore
to have supper - I
had my work. Told till
the hill. Hopped back
into the water when
Robie took a trout
from the water - he
had a very large one.
I found him to be very
large - it was
about 18 inches.

Mon. Sept. 6th

Letter to Worcester comes
Mrs. Steddy on Tuesday after
Talk with General Hillyer &
Brooks on his boat to the
hill - calm - water - with
water

Tues. Sept. 7th

Spent day in my boat
in the bay on Saturday
the water very rough
at 10 miles from the town
froth about four or five
feet on the water - we

He did get
a good deal of work
done & I am
very much obliged to him.

He is a very hard working
man & I hope he will
have many more opportunities

to do so. He is a good
able & valuable man.

Gregory & I & Mr. Smith
at dusk. Called B.M. Hoff
& Gregory down Hoff & I to
Muskegon for conference &
like Gregory. Both talk
well & Mr. L. delivered
short speech pleased him
very well with our

about my work - a very
interesting talk. You have
spared summer etc. Book
the off on my part of
your paper & G.S.A.
The field stuff & fed
paper on back. Don't
think much of glancing
them for you & book
and put them in portfolio
if you. Please try
to appear in about
in G.S.A. Fall - High
for the time you will
then send me to G.S.A.
for publication in com
for the use of both
Mr. et al. They will
all put me over to B.M.
& later get him if he
is not in Wash D.C. E

met Johnson & of course
had time to speak with
John W. Geist. Game
the 3000 feet, he went to
parade field & hill &
spoke with Nat Galt
(of the 3000 ft. side).
Also saw W. H. Clegg
& W. D. Steele. Steele
invited George &
with me to go to town
consequently with W. H.
Clegg - will say nothing
but temporarily.

Told as they may
about the part of us it
is certainly a misnomer
New Alberta River - it

is a split stream

and one running Platte

or compound with head

near or below Platte
Put off very near then
then about in line
between the two
ridges for Platte one man
to walk over!

Reported to me on

what you have to say

Tell all those along

full - with which I will

not be satisfied

at first we will do

nothing but voluntary

work more - large groups

fragment buffaloes

etc. etc. also have

the popular article - skull

in December & Feb

1860

1861

1862

1863

1864

1865

1866

1867

1868

1869

1870

1871

1872

1873

1874

1875

1876

1877

1878

1879

1880

1881

1882

1883

1884

1885

1886

1887

1888

1889

1890

1891

1892

1893

1894

1895

1896

1897

1898

1899

1900

1901

1902

1903

1904

1905

1906

1907

1908

1909

1910

1911

1912

1913

1914

1915

1916

1917

1918

1919

1920

1921

1922

1923

1924

1925

1926

1927

1928

1929

1930

1931

1932

1933

1934

1935

1936

1937

1938

1939

1940

1941

1942

1943

1944

1945

1946

1947

1948

1949

1950

1951

1952

1953

1954

1955

1956

1957

1958

1959

1960

1961

1962

1963

1964

1965

1966

1967

1968

1969

1970

1971

1972

1973

1974

1975

1976

1977

1978

1979

1980

1981

1982

1983

1984

1985

1986

1987

1988

1989

1990

1991

1992

1993

1994

1995

1996

1997

1998

1999

2000

2001

2002

2003

2004

2005

2006

2007

2008

2009

2010

2011

2012

2013

2014

2015

2016

2017

2018

2019

2020

2021

2022

2023

2024

2025

2026

2027

2028

2029

2030

2031

2032

2033

2034

2035

2036

2037

2038

2039

2040

2041

2042

2043

2044

2045

2046

of Hawaii Ocean May 2
will leave tomorrow
for San Francisco. My
fellow and I don't have
anything at all to contribute on
the Sub. paper - so he
thinks.

Met Blane performing
autumn - the Frisco P.
drove to ship

Chubb, Campbell, Cope
& Kuega to see us off.
Photo for paper - & good
by to Hawaii - temporarily

Felt with Hoffmuth
in evening

Sat Sept 11

Woke & took walk
all morning. Took walk
from hotel down to
Waikiki beach -

Sun Sept 12th

Spent day here, the
rest of time writing my
new book - finished
it by 10 AM - sent it
off the 25th at noon.

Mon Sept 13

Spent day at home
and of course was a bit
tired - but not too bad.

Tues Sept 14

Spent day at home
and of course was a bit
tired - but not too bad.

Wed Sept 15

30

Left San Fran. Shipped
air mail - ~~and~~ ~~and~~

Sun Sept 16th

Arrived San Fran.
Woke up early and
flew - San Fran - 2
Planes - 1 hour & 20 min
Flight - San Fran - 1 hr
to Coal Camp.

After time came from
Miles.

Mon Sept 17th

Fog in San Fran - flight
of 2 hours - 2nd attempt
got time to take delayed
flight - San Fran - San
Miles.

Left San Fran - flight
of 2 hours - San Miles - 2nd
attempt - San Miles - 2nd

attempt - San Miles - 2nd
attempt - San Miles - 2nd

attempt - San Miles - 2nd
attempt - San Miles - 2nd

attempt - San Miles - 2nd
attempt - San Miles - 2nd

attempt - San Miles - 2nd

attempt - San Miles - 2nd

attempt - San Miles - 2nd

attempt - San Miles - 2nd

Left & joined R. T. 3
connected to hotel for
night with Harry &
Brynnie. Dined
dinner \$5.00

Tue Sept 21st

Took 9¹⁰ AM R.T. for
Elba Park

O. L. - 1000 ft.

1000 ft.



